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ABSTRACT

The purpose of this project was to develop, implement, and evaluate a simple, teacher-friendly, environmentally-based anxiety reduction intervention for fourth-grade students. Review of related literature indicates that children are often victims of stress due to academic and sociological variables which exist within the school environment. Specifically, researchers have found that fourth-grade students encounter increased academic pressures which may put them at greater risk for stress. The purpose of this project was to develop, implement, and evaluate a simple, teacher-friendly, environmentally based anxiety reduction intervention for fourth-grade students. The intervention, titled Project SESAME (Student Environmental Stewardship Anxiety Management Exercises), contains activities which focus on teaching students about anxiety reduction within the context of environmental stewardship (accepting personal responsibility for environmental protection). The effects of the intervention on 113 students were evaluated by using the Spielberger State-Trait Anxiety Inventory for Children. Results indicated that there may have been a change in student state/trait discrimination capabilities. This outcome may be significant in that stress management interventions for children may need to focus on training participants to distinguish between varied forms of anxiety before the intervention in order that the intervention be effectively implemented and carried to a successful completion. Appended to the document are: (1) originals for overhead transparencies containing information about the intervention and its outcomes; and (2) six lesson plans, including objectives and learning activities. (Contains 20 references.) (Author/JDD)

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ED 379 209

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF AN ENVIRONMENTALLY-BASED ANXIETY REDUCTION INTERVENTION FOR FOURTH GRADE STUDENTS

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Development, implementation, and evaluation of an environmentally-based anxiety reduction intervention for fourth grade students

Abstract: The purpose of this project was to develop, implement, and evaluate a simple, teacher-friendly, environmentally-based anxiety reduction intervention for fourth grade students. Review of related literature indicates that children are often victims of stress due to academic and sociological variables which exist within the school environment. Specifically, researchers have found that fourth grade students encounter increased academic pressures which may put them at greater risk for stress. The intervention, entitled Project SESAME (Student Environmental Stewardship Anxiety Management Exercises), contains activities which focus on teaching students about anxiety reduction within the context of environmental stewardship (accepting personal responsibility for environmental protection). The effects of the intervention were evaluated by using the Spielberger State-Trait Anxiety Inventory for Children (STAIC). A Solomon Four Fold Design utilizing randomly selected groups served as the analysis matrix for the study. A Multivariate Analysis of Variance (2 by 2 repeated measures) indicated no significant interactive effects between student pre and post tests scores. However, a Post Hoc Factor Analysis of test items revealed a significant, consistent grouping of state/trait anxiety variables in the post test matrix as opposed to a random grouping in the pre test. This indicates that there may have been a change in student state/trait discrimination capabilities initiated by the intervention. This outcome may be significant in that stress management interventions for children may need to focus on training participants to distinguish between varied forms of anxiety before the intervention in order that the intervention be effectively implemented and carried to a successful completion.

INTRODUCTION

The ecologically interdependent systems that make life on earth possible are at risk. Consequently, the health of people - and indeed the prospects for survival of the species is becoming increasingly tied to the "health" of the planet. Diseases such as Sudden Infant Death Syndrome, Diabetes, Alzheimer's Disease, Multiple Sclerosis and others have been linked to specific environmental locations and variables. Social complacency and individual apathy only serve to compound global health problems. Common sense dictates that if we are to take our responsibility as professionals seriously [environmental stewardship], we must educate the public and enhance their appreciation of the delicate nature of the ecosystem and emphasize the necessity of becoming effective "environmental stewards" especially as it relates to individual and social responsibility for environmental management.

Passive exploration of data contained within books, magazines, videos and classrooms will not affectively prepare students and/or adults to accept personal and/or social responsibility for protecting the environment. The task requires an applied, action oriented, sensory, experiential approach to teaching about the environment. As it applies to children, Abraham Lincoln said, "A child is a person who is going to carry on what you have started. The fate of humanity is in his hands. So it might be well to pay him some attention."

Accepting personal and social responsibility for environmental management is crucial to understanding the breadth of environmental problems which exist in our world. A comprehensive understanding of the effects of individual and social behavior is required to initiate positive action that will serve to change institutionalized behaviors that damage the ecosystem. A part of the

solution to the problem is the elimination of culturalized anxiety created by environmentally-based stressors.

The purpose of this project was to implement and evaluate an environmentally-based anxiety reduction intervention for fourth grade students (Figure 1) in a selected elementary school in the Piedmont region of North Carolina. The general goals of this project were twofold: (1) involve students in environmental management during in-school discretionary time and (2) create action-oriented, student-centered activities which may allow students to develop pro active "environmental stewardship" approaches to environmental management tasks at school and in the home.

The nature of the problem(Figure 2) was to attempt to reduce varied levels of anxiety in fourth grade students which exist as a result of academic and social demands found within an elementary school environment by implementing environmentally-based activities during in-school free time. The following operational definitions are offered in order that they may assist the development of a comprehensive understanding of this project. Environmentally-based activities: student-centered assignments which deal with specific curricular components (air, water, recycling, plants, animals, composting, etc.). Environmental management: daily maintenance activities which focus on sustainable development of resources. Environmental Stewardship: accepting personal responsibility for environmental management. State Anxiety: how a person feels at the present time. Trait Anxiety: how a person feels in general, over time.

Many successful anxiety reduction interventions developed for adults have incorporated activities such as walking and gardening as techniques used for

personal management of anxiety. Moore (1989) stated that "the power of gardening to help restore people's health has been realized since the beginning of civilization." Moreover, it is the feeling of not being a part of ones' own environment which often causes anxiety (Greenberg, 1990). If children learn from, have behavior encoded by, and are socialized in relation to their environmental experiences, environmentally-based stewardship activities may help to restore a link to the natural world by making students feel that by and through their contributions to environmental management they are useful, important parts of the natural ecological process that directs our lives.

Specifically, modern cultures tend to "externalize" the environment. That is to say that the environment is "out there" and we are "in here." We air condition our homes, automobiles and work places and only encounter the real environment when we are in transit between these venues. Externalizing the environment in this way, tends to separate us from the world in which we live and allows us to forget what it is like to live, travel and work in places where the existing climatic conditions affect us minute-to-minute.

The significance of this study was fourfold. First, fourth grade students were chosen because they often experience a time of transition from primary grades to the upper elementary grades where the curriculum becomes more difficult and expectations for academic achievement are heightened. Therefore, because fourth grade students are at-risk for increased levels of school related anxiety the investigators sought to develop a new approach to anxiety reduction. Second, fourth grade students (ages 10-11) are in the pre-stages of puberty which is also considered as a contributing factor to increased levels of anxiety. This

approach (Figure 3) differs from existing anxiety reduction programs (i. e. Stress Management) in that it is non-controversial and does not include techniques which, at present, are being questioned by a number of special interest groups across the nation.

Third, schools in the United States are charged to promote environmental stewardship as a national ethic (Environmental Protection Agency, 1992). Project SESAME (Student Environmental Stewardship Anxiety Management Exercises) is an intervention which focuses on teaching students about environmental stewardship (Accepting personal responsibility for environmental protection) and involves them in activities that may be beneficial in the reduction of stress and related anxiety. Fourth, Project SESAME was designed so that it could be easily integrated into discretionary school time. The eclectic nature of the components of this initiative can serve to focus in-school environmental management efforts on providing an action-oriented link to existing curricular components.

Children and Stress

Levels of stress and related anxiety have profound effects on student health and academic performance. Children react differently to stress than adults, and consequently, may lack the skills to deal effectively with anxiety in their lives. Many adults learn to manage stress and its possible negative effects. Children, on the other hand, do not have not developed effective stress management skills. Balog and Balog, (1991) stated that, the difference between adults and children in dealing with stress are: (1) children have less control over their lives, and (2) children do not have the reasoning powers that adults have. Thus children are

placed at a disadvantage when dealing with life's everyday problems." Unfortunately, being a school-aged child has become more stressful than ever before (Figure 4). Blom, Cheney, and Snoody (1986) stated "that children are subject to stress-inducing environmental events and situations just as adults are." Stress is a necessary part of life but when it becomes overwhelming and unmanageable it may cause serious illness or even death (D'Aurora & Fimian, 1988). While adults identified work as a major source of their stress, children and adolescents identified school as a primary stressor (Swick, 1987).

Stress and the School Environment

Varied school environments and related academic demands can be considered major stressors for children. Teachers and parents have high expectations for students to achieve and these expectations may place the students at-risk of experiencing higher levels of anxiety. Children spend a majority of their time in school and as such anxiety may result when the child's individual goals are not in congruence with the teacher's goals (Weimer, 1987). Proeger and Myrick (1980) stated that "many elementary students do not perform at their ability level due to excessive anxiety and stress." Helms and Gable (1990) identified four sources of stress in the school environment: (1) teacher interaction, (2) academic stress, (3) peer interactions, and (4) academic self-concept. Each teacher is different in his/her teaching style thus the pupil-teacher interaction is important in maintaining a healthy learning environment. A child who cannot interact effectively with his/her teacher may suffer anxiety which may inhibit his/her academic performance. Academic stress and academic self-

concept may both cause anxiety when the student does not perform at his personal expectation, teacher expectations, and/or parental expectations.

Peer interactions also play an extremely important role in the student's life, and consequently, not having friends as a support system can be stressful. Webb, Van Devere, and Ott (1984) conducted a study that compared effective distress in elementary school children and adolescents and concluded that elementary students are quite aware of stresses that confront them and that their levels of distress may even exceed those of the adolescents. In addition, students need to have a positive elementary school experience because it sets the tone for the rest of their schooling.

Weimer (1987) has found evidence that supports the theory that elementary school is indeed stressful for students. Students in the fourth grade have a rigorous curriculum in which more complex academic tasks are to be performed. In schools across the nation, fourth grade is a grade of transition from the lower elementary grades. In many schools, Kindergarten through third grade classes have an assistant in addition to the classroom teacher. Beginning with the fourth grade, there is no assistant in the classroom. Students are taught in large groups and are expected to begin script writing as opposed to printing. Students are tested and thereafter, may be placed into special programs or tracked through the school building. Students also must be prepared for end-of-course and other evaluation protocols. Thus students may encounter a greater level of stress related to increased academic and social demands placed upon them by the changing academic environment.

Stress Reduction Interventions

D'Aurora and Fimian (1988) stated, "before children can cope effectively with stress, they must become aware of the presence of stress in their lives." Zaichkowsky, Zaichkowsky and Yeager (1986) stated that "arming children with tools for combating stress should help reduce stress related disorders in later life." Many researchers have conducted studies that have generated favorable results regarding the training of students in stress management techniques (Miller and Mc Cormick, 1991). Zaichkowsky, et al. (1986) conducted an experimental study of fourth grade students that found favorable results when teaching lessons on stress responses and coping techniques. Conger (1985) conducted a study to determine the effectiveness of an anxiety reducing program that used the Spielberger State-Trait Anxiety Inventory for children with fourth grade students. Conger (1985) found that at the end of the study students receiving the anxiety reducing program (including muscle relaxation, imagery, role playing and goal setting) had lower anxiety levels than those not receiving the treatment. Edwards and Hofmeier (1991) have found that stress management techniques that are taught in physical education classes may provide a vehicle that encourages the concept of total well being.

While all the programs referred to above did have positive results, it is important to mention that many existing stress management programs employ techniques such as imagery and role playing which are considered controversial by special interest groups. Anxiety reduction techniques such as self-esteem evaluation, imagery, or progressive relaxation exercises are viewed as objectionable and inappropriate. Consequently, there is a need for new types of

anxiety management interventions that are teacher-friendly, not objectionable and may be easily incorporated into existing curricula. Jacobs (1989) stated that interdisciplinary units help students by linking information together and providing them with a more relevant approach to the curriculum. An anxiety management intervention that utilizes environmental education may be considered a type of interdisciplinary unit. For example, Project WILD is an interdisciplinary, supplementary environmental and conservation education program emphasizing wildlife (Project WILD, 1986). Activities taken from this type of curriculum may have not been used in the context of anxiety management but may provide activities and experiences effective in the reduction of anxiety.

Environmentally-based Stress Reduction Interventions

Researchers who have conducted anxiety management programs with children have found that children do not have necessary stress management skills. Blom, et al. (1986) suggested that children's stress may be caused by different events and conditions than those of adults. Therefore, not only do children manage stress differently, they also have different stressors. Balog and Balog, (1991) stated that, "the difference between adults and children in dealing with stress are: (1) children have less control over their lives, and (2) children do not have the reasoning powers that adults have. Thus children are placed at a disadvantage when dealing with life's everyday problems." Common child stressors identified by Swick (1987) can be found in (Figure 5). Aside from the obvious impact of developmental factors, the external factors appear to be closely associated with the child's' subjective perception of specific stressors.

Educational interventions, especially environmental activities, must represent more than just a passive review of in formation (Figure 6). Project SESAME (Figure 7) utilized environmental activities which required the student to observe, evaluate and formulate values relative to his/her surroundings. In this manner, the child may develop more practical, accurate perceptions of the world. The benefits of this anxiety management format are three fold. First, all activities are action oriented which give the student an opportunity to get exercise. Many stress and anxiety management programs incorporate exercise as a means of reducing stress. Exercise can serve as a tension reducer especially those activities that are done outdoors. Many successful anxiety reduction interventions for adults have incorporated activities such as walking as a technique for personal management of anxiety. If activities such as these have been successful with adults and if the stress response is essentially the same for children, it appears that the same activity would be beneficial.

Secondly, it is the feeling of not being a part of one's own environment often causes anxiety (Greenberg, 1990). Environmental stewardship activities help to restore a link to the natural world by making children feel that, through their contributions to the environment, they are useful, important and a part of the natural process of growth.

Within SESAME, students are engaged in school-based activities that they can also use during discretionary time at home (Figure 8). Children have more discretionary time than ever before. Balog and Balog (1991) stated that "children spend more time watching television than they do in their classroom or participating in after-class activities." An environmental anxiety reduction

intervention helps children in development of creative thinking skills and personal methods of reducing anxiety by providing students with activities that could be used at their discretion. Students are challenged to assume responsibility for reducing their own anxiety by and through direct interaction with the natural world. Over time, this approach to anxiety management may reduce the negative effects of stress and anxiety on personal health.

Third, environmental activities provide students with activities that are closely related to academic disciplines and as such represent an interdisciplinary approach to curricular development. Environmental stewardship activities related to air, water, animals, plants, and land can be incorporated into subjects such as science and math (See Appendix). The intervention helps to increase student knowledge and skills by giving them actual hands-on experiences. In this manner, students may gain a deeper appreciation of their environment, develop essential student skills and learn about activities which may be beneficial in reducing their anxiety levels.

METHODOLOGY

The intervention was implemented during discretionary time within the school day (post class activity period); not as part of the normal daily class schedule. The intervention was implemented by the physical education specialist, not the classroom teacher. This represented an attempt to remove one of the most common stressors in the school environment. Subjects were pretested prior to the intervention to determine existing levels of state/trait anxiety. The intervention was conducted over a period of six weeks and thereafter students were post tested

to determine whether the intervention program had any effect on levels of student state/trait anxiety.

The subjects in this study included 113 fourth grade students with ages ranging from 8 to 12 years of age. There were 60 males (67 percent) and 53 females (33 percent) in the sample. Students within this sample (Figure 9) had been randomly assigned to classes by the principal at the beginning of the school year therefore, these class groups were maintained throughout the duration of the intervention.

The instrument selected to assess levels of student anxiety was the State-Trait Anxiety Inventory (STAIC) (Spielberger, Edwards, Montuori, and Platzek, 1973). This instrument (Figure 10) is designed to measure anxiety of upper elementary and junior high school-aged children. The STAIC distinguishes between specific anxiety (A-State) which views anxiety as a fleeting emotional state and a general proneness (A-Trait) to anxious behavior rooted in the personality. The instrument consists of two 20 item scales. The A-State scale measures emotional state which includes immediate feelings of apprehension, nervousness, and worry. The A-Trait scale measures how a person feels in general. Since anxiety states can be transitory in nature, alpha coefficients provide the best measure of reliability. Data regarding instrument reliability are as follows: A-State Male, .82 and Female, .87; A-Trait Male, .78 and Female, .81.

The analysis matrix chosen for this study was the Solomon Four Fold Design (Figure 11). A total of four randomly assigned student groups were used. A blind draw was conducted in order to assign the classes to groups. The primary statistical protocol used in this study consisted of a Multivariate Analyses of

Variance (MANOVA) utilizing a repeated measures analysis within subjects tested at the .05 level of significance. The independent variable was the groups as determined by the Solomon Four Fold Design. The dependent variables were the student anxiety level pre and post test scores as measured by the STAIC.

Results

A Multivariate Analysis of Variance (MANOVA) was performed in order to identify the existence of interactive effects between and/or within subject test scores. The results of the analysis indicated that there were no significant interactive effects ($p = .731$) within subjects and therefore led the investigators to conclude that the intervention had failed to reduce anxiety levels among the subjects (Figure 12).

However, concerns about the effects of a small sample size on the outcome of the primary analysis prompted the investigators to undertake a post hoc Principal Axis Factor Analysis with Varimax Rotation (PAFAVR) in order to determine if subject responses to test items had shown any trends or had remained consistent from pretest to post test. The Factor Analysis revealed that there were major differences in the groupings of student state/anxiety scores from pre test to post test within subjects ($X^2 = .000$). Thereafter, a post hoc MANOVA was undertaken to determine pre and post test comparability revealed a statistically significant difference between the two tests (Wilkinson, $p = .001$; Effect Size = .19, Power = .94).

Pre test items reflected a random grouping of negative and positive items. Pre test items existing within Factors 1, 2 and 3 are presented in Figures 13 & 14.

The random grouping of state/trait negative and positive items may be representative of an inability of the subjects to discriminate between specific forms of anxiety and related stress.

The grouping of post test items was consistent, showing a trend toward the ability to group physical and emotion anxiety states and traits in addition to the positive and a negative grouping of variables Figure 15. Post test items existing within Factor 1 and Factor 2 are presented in Figures 16, 17 & 18. The negative/positive grouping of state/trait anxiety items in the post test (State Anxiety, $p = .03$; Trait Anxiety, $p = .06$) Factor Analysis is much more consistent. The Percentage of Variance and Eigen Values for the post test items (Factor 1: 22.9 and 9.16, Factor 2: 10.7 and 4.26, Factor 3: 8.9 and 3.54) was higher than those of the mixed factors in the pretest (Factor 1: 16.2 and 6.47, Factor 2: 9.9 and 3.97, Factor 3: 8.9 and 3.54). These values reflect the presence of a stronger relationship and therefore may represent an improvement in student ability to subjectively discriminate between variants of state/trait anxiety.

Discussion

The concept of individual perception of stress and resultant anxiety and the ability to discriminate between state and trait anxiety is important to the development of effective anxiety reduction interventions and as such warrants further investigation. Girdano and Dusek (1988) stated "Stressed people are stressed because they have had a stressful lifestyle and have learned through years of conditioning to react in a stressful manner." Thus, the process of understanding and interpreting anxiety may be a life long experience. Stress

management programs as they currently exist may not work for individuals with perceptual capabilities that are not fully developed or conditioned; children for example.

Young children may operate on the specific stress side of the continuum. That is to say, that in comparison to adults, they react to much more specific stress than nonspecific stress (Figure 19). They also have difficulty in differentiating between levels of anxiety and anxiety states. When a baby is hungry, he/she cries in order to have his/her need met because the body interprets the hunger as global anxiety. As the ability to discriminate develops, children learn to control emotional responses by interpreting their perceptions in response to specific versus global demands (state versus trait anxiety). This means that they are in the process of learning to discriminate between specific and nonspecific anxiety and therefore, individual perceptions or discriminant capabilities may play a key role in how a child reacts to the stressor.

Comparatively, over time, adults have developed the ability to discriminate between sources of anxiety and react to resultant stress according to their personal perceptions of the stressor. In addition, many adults possess the perceptual ability to identify anxiety in positive (eustress) and negative (distress) terms. Logically, development of stress management programs that include techniques for helping individuals discriminate between anxiety states may improve the success of these types of interventions.

Data from this project indicated that there was a change in the subjects capability to discriminate between "state" and "trait" anxiety which may be attributed to the intervention. While the intervention per se did not reduce levels of

anxiety, it may have helped students to distinguish (Figure 20) between anxiety states in positive and negative terms (state versus trait and/or physical versus emotional).

Conclusions

The relationship between subjective perceptions of anxiety states and discriminant capabilities has important implications for those who seek to develop effective stress management interventions; especially those designed for children. Stress management techniques as they exist now may assume that children have already learned to discriminate between varied forms of anxiety. However, if the child has not learned to discriminate between anxiety states/traits, it would be difficult (if not impossible) for a child to learn to manage varied forms of related stress that he/she can not effectively or accurately discriminate. Anxiety and stress management programs for children may have more success in the future if they would focus on helping the child to discriminate between the two forms of anxiety (Figure 21). In this way, children are empowered to differentiate between long and short term anxiety states. This simple skill may assist them to more effectively manage related stress.

Recommendations

The investigators make the following recommendation. More research needs to be in the area of the positive and negative effects of the environment on individual health status; especially children. Children's Environmental Health Network (CEHN) director Joy Carlson (1994) stated, "Children are both data and

policy orphans when it comes to the environment. As a nation, we are not doing a good enough job of protecting children from environmental hazards."

Common sense dictates that if we are to take our responsibility as professionals seriously and if we truly intend to protect our children from health risks, we must educate students and enhance their appreciation of the delicate nature of the ecosystem in order that they understand the link between their health and the environment in which they live. We must emphasize the necessity of becoming effective "environmental stewards" and focus on the positive effect this form of behavior has on our health status.

The Children's Environmental Health Network (CEHN, 1994) stated that "New research paradigms need to be developed to study long-term, delayed and potential transgenerational health effects resulting from environmental exposures." To date, very little research has been done in the area of environmental curricula and the potential for effectively teaching children to improve their health status. This pilot intervention was not statistically effective. However, outcomes may be more closely linked to the complexity of the analyses than the effectiveness of the intervention. This study should be replicated, utilizing a larger student sample.

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Figure 1

Purpose of the Study

- **The purpose of this study was to develop, implement and evaluate an environmentally-grounded anxiety reduction intervention for fourth grade students at a selected elementary school in the Piedmont region of North Carolina.**
  - **The intent was to develop a "teacher-friendly" curriculum, i. e. a program that did not use meditation or other so-called "controversial" stress reduction methodologies.**

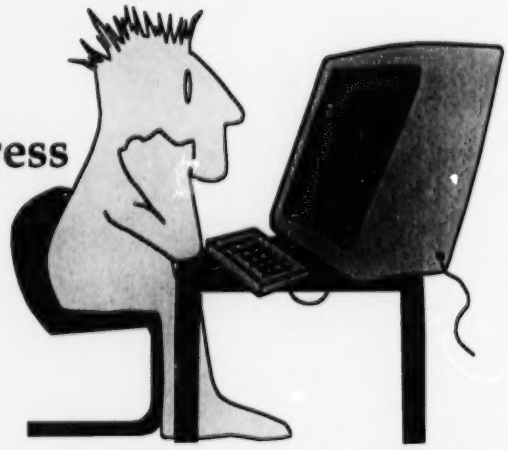


Figure 2

The Problem

The nature of the problem was to attempt to reduce varied levels of anxiety in fourth grade students acquired as a result of interactions with social and academic demands found in an elementary school setting.

The anxiety reduction intervention was developed within the context of an action-oriented, environmentally-based, after-school program which emphasized effective use of discretionary time.

Figure 3

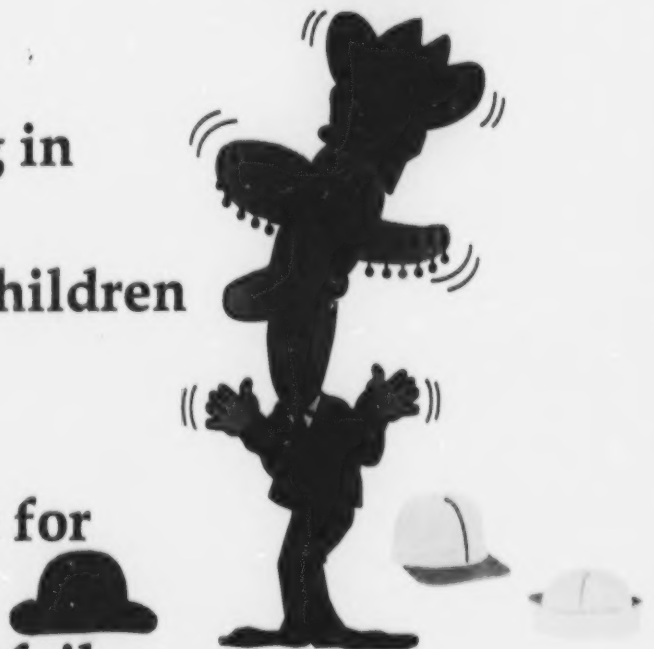
PROJECT SESAME

- **Action oriented**
  - In-school discretionary time
- **A "Stewardship" approach to anxiety reduction**
  - assuming responsibility for the welfare of other living things can ameliorate personal anxiety because it takes the focus off "self".
- **Teacher Friendly**
  - Non - controversial
  - No meditation
  - No imaging

Figure 4

Evidence suggesting that children may be victims of anxiety related stress.

Elkind, 1988



- Increased infant mortality rates.
- Increased numbers of children living in poverty.
- Increased percentages of obesity in children and adolescents.
- Increased rate of pregnancies.
- Increased suicide and homicide rates for children.
- Fifteen to twenty percent of children fail kindergarten.
- Increased numbers of children taking medicine to make them more tractable.

Figure 5

Stressors Common to Children

Internal Factors:

Gender

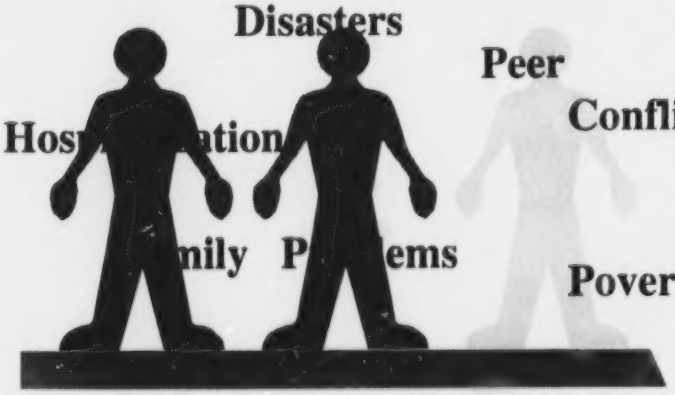
Developmental Delays

Illness

Developmental Stages

Stress

External Factors:



Disasters

Peer Conflicts

Hos ation

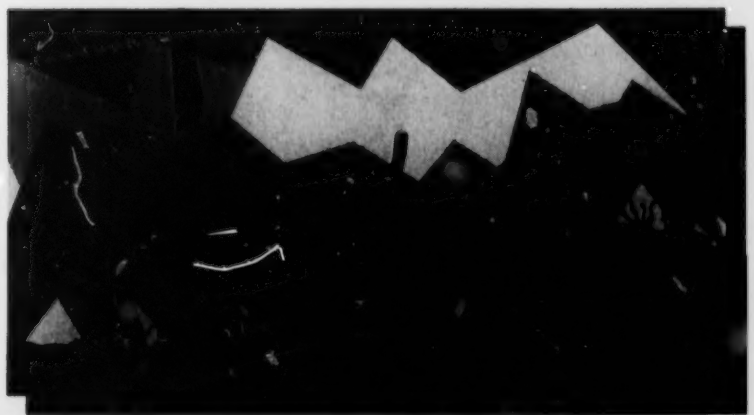
mily P ems

Poverty

School Stressors

Figure 6

Environmental Education must be more than a passive review of information.



Environmental Education is most effective within interventions where students are:

(1) internalized by the environment,
(2) challenged by the nature of the environment,
(3) where they can engage the environment one-on-one.

Figure 7

Project SESAME: A Teacher Friendly Environmentally-based Anxiety Intervention

Student Journals: what did you feel?

Observation Stations: what did you see?

Feeding Stations & Tree Planting: caring for other living things.

Litter Walks & Waste Container Maps: exercise.

Home Energy Survey: home transfer.

Storm Water Runoff: conceptualize problems.

Recycled Paper: how things change.

Figure 8

Project SESAME: A Teacher Friendly Environmentally-based Anxiety Intervention

In-School Discretionary Time:
time spent not working or performing maintenance activities.

Activities Focus On:

Anxiety State: How you feel right now.

Anxiety Trait: How you feel most of the time.

Figure 9

Age/Gender Distributions: Grade Four

AGE	MALE	FEMALE	TOTAL
8	2	0	2
9	40	38	78
10	17	15	32
12	1	0	1

N = 113

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Figure 10

STAIC: State-Trait Anxiety Inventory
Spielberger, et al., 1973

A - State		A - Trait	
Male	.82	Male	.78
Female	.87	Female	.81

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Figure 11

Research Design

The Solomn Four Fold

G = Randomly assigned groups; P = Pretest; PT = Posttest; X = Intervention

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Figure 12

MANOVA: Repeated Measures

Between Subjects:

	Value	Exact F	Hypo. DF	Error DF	Sig.
Wilkinson	.99	.32	2.0	68.0	.731
Within Subjects:	Chi- Square		21.60 w/ 2 df	Sig. = .000	
Pre/Post Test Comparability:					
Wilkinson	.81	7.76	2.0	68.0	.001

Effect Size = .19 Power = .94

Effect Size: the degree to which the null hypothesis is false.
Power: the chance of finding a significant difference.

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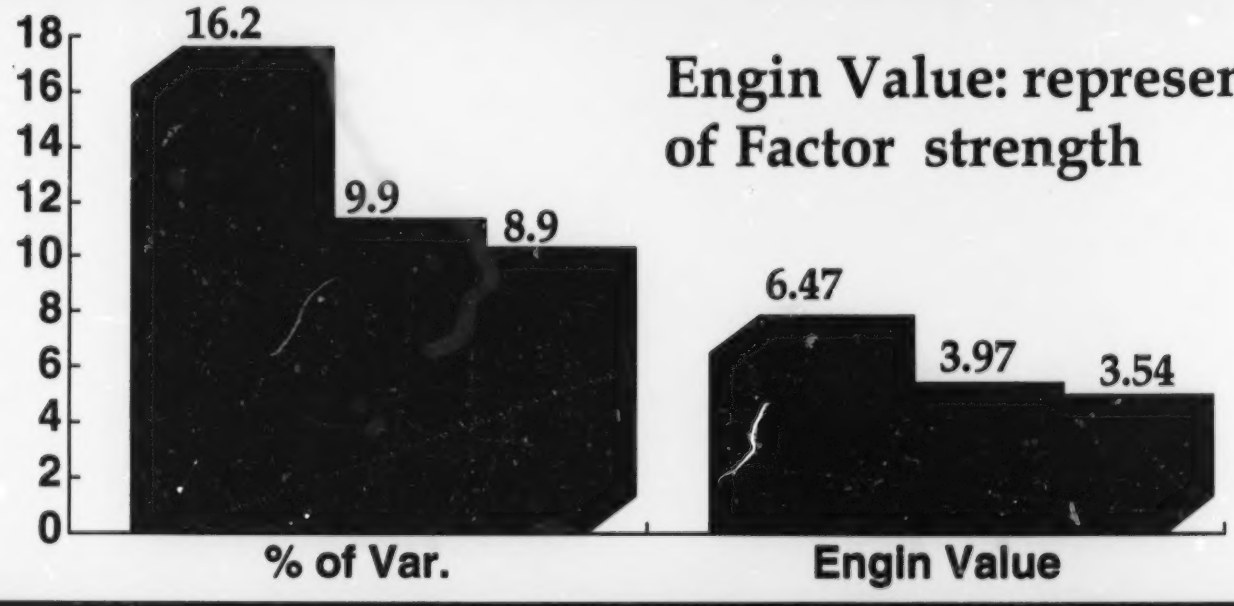
Figure 13

Inconsistent Pre test Variables: Factors 1, 2 and 3



Factor 1 Factor 2 Factor 3

*9 State *2 State *6 State
8 Trait 8 Trait 0 Trait

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Figure 14

Pre test Anxiety State/Trait Items: Factors 1, 2 and 3

FACTOR 1

- GOOD
- WORRIED
- HAPPY
- AM TROUBLED
- FEEL TROUBLED
- SATISFIED
- CRYING
- AFRAID
- SURE
- CHEERFUL
- WORRY
- UNIMPORT. THOUGHTS
- CALM
- UPSET
- CAN'T DECIDE
- HEART BEAT

8 STATE - 8 TRAIT: 6 POSITIVE Vs. 10 NEGATIVE

FACTOR 2

- UNIMPORT. THOUGHTS
- WORRY/DECISIONS
- CAN'T DECIDE
- UPSET
- WORRY/HAPPEN
- SCARED
- HANDS SWEAT
- CAN'T SLEEP
- FRIGHTENED
- JITTERY

2 STATE - 8 TRAIT: 10 NEGATIVE

FACTOR 3

- TERRIFIED
- PLEASANT
- RESTED
- NICE
- RELAXED
- UNHAPPY

6 STATE:
4 POSITIVE Vs.
2 NEGATIVE

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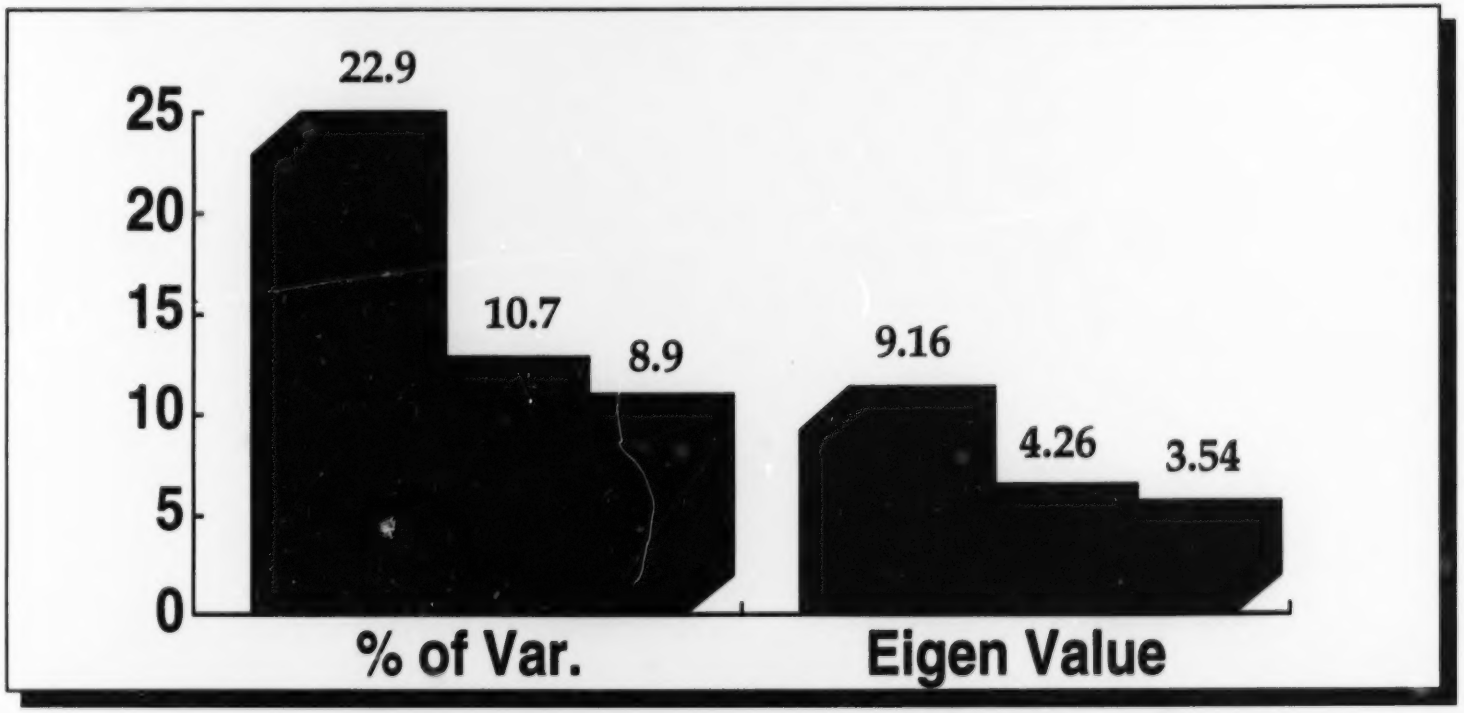
Figure 15

Consistent Post test Variables: Factors 1, 2 and 3



■ Factor 1 ■ factor 2 ■ Factor 3

*State * State *Trait: Physical

Figure 16

FACTOR ANALYSIS

"How I Feel" Questionnaire Post Test

EIGEN Value	% of Variance	Loading	Item	Response
9.16	22.9	.84	I feel frightened	State
		.83	I feel troubled	State
		.80	I feel bothered	State
		.77	I feel upset	State
		.77	I feel scared	State
Factor 1		.76	I feel neverous	State
		.75	I feel worried	State
		.74	I feel mixed-up	State
		.71	I feel terrified	State
		.53	I feel jittery	State

Figure 18

FACTOR ANALYSIS

"How I Feel" Questionnaire Post Test

EIGEN Value	% of Variance	Loading	Item	Response
3.54	8.9	.68	I feel troubled	Trait
		.62	I get a funny feeling in my stomach	Trait
		.60	I feel like crying	Trait
		.58	I notice my heart beats fast	Trait

Factor 3

Figure 17

FACTOR ANALYSIS

"How I Feel" Questionnaire Post Test

EIGEN Value	% of Variance	Loading	Item	Response
4..26	10.7	.76	I feel good	State
		.75	I feel cheerful	State
		.73	I feel happy	State
		.72	I feel pleasant	State
		.69	I feel relaxed	State
Factor 2		.67	I feel nice	State
		.66	I feel sure	State
		.61	I feel satisfied	State
		.59	I feel rested	State
		.47	I feel calm	State

Figure 19

STRESS AND RELATED ANXIETY STATES
Specific or Non-Specific: That is the Question.

Non-Specific

Unidentifiable : High Anxiety

Specific

Identifiable : Low Anxiety

Figure 20

Post Hoc: Factor Analysis

Pre and Post Test Variances of "State" and "Trait" Anxiety within Factors 1, 2 and 3

PRE TEST

Positive and Negative

State and Trait

Emotional & Physical

POST TEST

Positive Positive

Positive

Positive Positive

Negative

Negative

Negative

Negative

Negative

Figure 21

Intervention Out comes

Discrimination: "Student Empowerment"

- Children have little if any control over situations and/or things which may stress them. Developing the ability to discriminate between varied forms of anxiety states may be helpful within the context of short term stress management interventions.
- In addition, the ability to discriminate between negative and positive anxiety states may afford children a measure of control over their perceptions of the stressor and thereby may assist the development of effective life-long coping skills.

Project SESAME: A Teacher Friendly Environmental Curriculum

Student
Environmental
Stewardship
Anxiety
Management
Exercises

APPENDIX

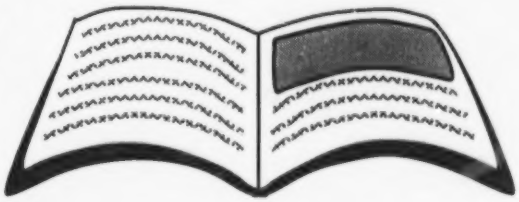
Sandra Cope Mitchem, M Ed.

G. Greg Wojtowicz, Ph D.

Appendix: PROJECT SESAME

Rationale: The ecologically interdependent systems that make life on earth possible are at risk. Consequently, "the health of people - and indeed the prospects for survival of the species is becoming increasingly tied to the "health" of the planet." Diseases such as Sudden Infant Death Syndrome, Diabetes, Alzheimer's Disease, Multiple Sclerosis and others have been linked to specific environmental locations and variables. Social complacency and individual apathy only serve to compound global health problems.

The following contains the lesson plans for the SESAME anxiety reduction intervention. The intervention lasts for 6 weeks. The project director meets with intervention groups twice a week. The first meeting lasts 30 minutes and the second meeting lasts 45 minutes.



Stewardship and Environmental "Journals"

LESSON 1

FIRST SESSION: ENVIRONMENTAL STEWARDSHIP IT'S UP TO YOU!
The first session will be an introduction to the program and the concept of environmental stewardship. This session will last for 30 minutes.

OBJECTIVES:

The student will:

1 - Define "environmental stewardship."

2 - List five activities that they have participated in or will participate in on a sheet of paper and present one activity to be used in a class graph of activities.

3 - Share one idea with the class on an activity that he/she could perform that would help the environment.

4 - Find one article concerning the environment and place it in a folder.

5 - Write in a journal regarding personal activities that they perform which will help "Save the Earth."

Materials:

1. A plain folder for each student.

2. Enough paper to allow each student to create a journal.

ACTIVITIES

1 - Conduct an experiment that will help students increase their awareness of how many times we get caught up in our own lives and forget to take care of the earth. This activity is adapted from Eco-Experiment #6 (The Earth Works Group, 1990). Students are asked to write down a place where they do their best thinking. Ex. In the bed, just before falling asleep. Then ask students to write down five activities that they thought of the last time they were doing their best thinking. Students should include where and who this activity occurred with. The director then makes a graph on the board that includes the following categories: World, City/State, Friends/Neighbors, Family/Yourself, Tomorrow, Next Week, Few Years, Lifetime. Ask students to share one activity that they wrote down on their list with the class. The director graphs each student's response. After everyone has shared their answer, discuss how the answers of the class fell on the graph. Point out the fact that many times we are concerned with other things so much that we forget to do activities that could help "Save the Earth." Have each student give one activity that he/she could perform that could have a great impact on the environment. List all activities on the board. Challenge students to try to perform these activities over the next week. Point out the value not only to the earth but also that students would be doing something good for themselves by reducing stress and getting exercise.

2 - Give each student a folder and ask them to draw a picture of how they could do something positive for the environment. Ask each student to collect one newspaper or magazine article that deals with the environment in either a positive manner or a negative manner. Ask students who find negative articles to think of ways that may help improve the negative aspects of their articles. Students should keep the articles in their folders.

3 - Give each student a notebook and explain that his will be their "Save the Earth" journal. Ask students to keep a journal about things they see or do that will help preserve the environment. Students will be asked to share ideas written in their journals with the class the next time the groups meet.

4 - Lead a class discussion in which the class defines what the term "environmental stewardship" means.

WEEK 2

Session 1: WHAT'S OUT THERE?

This session will focus on the five elements of the environment: LAND, AIR, WATER, ANIMALS AND PLANTS. This session will last 30 minutes.

OBJECTIVES:

The student will:

1 - Discuss their environmental article within their groups and graph the articles according to which aspect of the environment it relates. (Land, Air, Water, Animals, and Plants)

2 - Discuss the environmental activities as related to their journals and graph them according to which aspect of the environment it relates.

3 - Complete the worksheet entitled "Observation Station" and write the answers in their journal before the next meeting.

MATERIALS:

HANDOUT SHEET: "OBSERVATION STATION"

ACTIVITIES

1 - Place students in groups and have each group elect a secretary who will record the results of the group's discussion. Ask students to graph their articles and journal entries as they relate to the following aspects of the environment: Land, Air, Water, Plants, and Animals. Have the secretary report findings to the director and write the results on the board. discuss how the activities and articles are related to the five categories. Have students write all five aspects in their journals and challenge them to try to do activities which would relate to each category.

2 - Give each student the worksheet entitled "Observation Station" and explain the directions to the class. Tell students that all answers are to be written in their journals for discussion at the next meeting.

3 - Remind students to do environmental activities to help them unwind and deal with stress that they may encounter during the school day.

ADDITIONAL ACTIVITIES

OBJECTIVES

The student will :

1- Explain the importance of water to people and wildlife.

2- Understand the impact of acid rain on aquatic wildlife.

3- Understand how plastic waste impacts on all aspects of the environment.

4- Create action plans to decrease plastic waste in their homes.

5- Understand how littering impacts on the water and their environment.

6- Create a story of animal entanglement and a rescue.

7- Create finger puppets and act out their animal entanglement/rescue stories for their classmates.

ACTIVITIES

1- This activity was adapted from "Aqua Words" (Aquatic Project WILD). Students will collect photographs from magazines that show water. The class will discuss the importance of water to people and wildlife. The director will ask students to create a list of words associated with water. Students will create poems using the various water-related word. Students will then form groups and develop an action plan to help conserve water at their school and homes.

2- The director and students will discuss acid rain and its effects on the environment. Students will collect water samples from their homes and surrounding creeks, lakes, rivers, etc. This activity was adapted from "Deadly Skies" (Aquatic WILD). Students will test the acidity of their water samples using hydrion paper. Students will discuss how high acidity impacts on aquatic wildlife. Students will then create posters to alert their community to the consequences of acid rain.

3- Students and director will discuss how plastic waste impacts on the land, water, and animals. Students will collect and save plastic waste in their homes over a two day period. This activity is adapted from "Plastic Jellyfish" (Aquatic Project WILD). Students will bring their plastic waste collection to school. They will categorize all of the plastic waste collection and hypothesize about how these materials affect our land, air, plants, water, and especially animals. Students will create action plans to help combat the plastic litter problem. (Example: Setting up a plastic recycling depot.) Students will record all finding and action plans in their journals.

4- This activity was adapted from "Fatal Food" (Splish Splash). Students will participate in a relay. At the end of the relay lines, there will be paper bags fill with various food and litter in hula hoops. If the student selects a "fatal" food, he or she must go to a designated sick area. At the end of the relay, students will discuss why some litter may prove to be "fatal" to animals. Students will discuss ways to help stop this problem and write all their suggestions in their journals.

5- This activity was adapted from "A River Rescue" (Splish Splash). The director and students will have a class discussion in which students share ideas regarding the danger of liter to rivers, lakes, ocean, etc. The class discussion will also focus on how animals become entangled and why this may prove to be life-threatening to these animals. Students will form groups and create stories of animal entanglement and a rescue. The students will make finger puppets and act out their stories for the rest of the class.

Session 2: "Environmental Issues" This session will last for 45 minutes.

OBJECTIVES

The student will:

1 - Share one answer from their "Observation Station" worksheet.
2 - Perform Air Experiment #1 and Water Experiment #1 and record results in their journals.
3 - Write journal entries regarding activities that he/she is doing to take care of the environment.

ACTIVITIES

1 - Have a class discussion about the "Observation Station" worksheet. Have each student share one of their answers and write it on the board. Point out that this activity involved many of the environmental aspects that were discussed at the last meeting.

2 - Students and director will perform Air Experiment #1. This experiment was adapted from Eco-Experiment #3 (The Earth Works Group, 1990). Divide the class into two groups. Students will need the following materials:

4 coat hangers
16 rubber bands
2 large plastic bags

Have students bend the coat hanger into a rectangle and put the rubber bands onto the coat hanger. Make sure the rubber bands are stretched tight. Put one of the coat hangers in the plastic bag and place in a dark place where it will not be bothered. Have the groups decide where the other coat hanger will be placed outside. Leaver the coat hangers for a week. Experiment will be completed after the week has passed.

3 - Students and director will perform Water Experiment #1. The class is divided into four groups and each group has the following materials:
4 large cups of water
4 stalks of celery with leaves
4 food coloring dyes

Each group will be assigned a specific number of drops of food coloring to put in their cups of water. Then the celery stalk is added. Students mark their cups according to the number of drops of food coloring that they added. Have students observe what happens to each group's celery over a two day period. Students should write their observations in their journals and be ready to discuss them at the next meeting.

4 - Have students continue to keep their journals regarding their activities at home which are related to helping the environment.

Student Name _____

Observation Station

Do you have a favorite place where you go to watch animals? If not, find one! Think of an out-of-the-way spot where you can watch birds or bugs, pets or pigeons -- any animals at all. Then answer the questions below on a separate sheet of paper.

1. List the animals that you watch from your favorite place. For each animal you list, tell whether it is a wild animal, a pet, or a farm animal.

2. List the things that you see around your favorite place. (Are there trees or plants? Are there sidewalks or building?)

3. List the colors that you see around you in your favorite place. (Are there brightly colored flowers, green grass, blue sky, or gray buildings?)

4. What sounds do you hear in your favorite place? (Do you hear people, pets, wild animals, cars, airplanes, wind, or ocean waves?)

5. What smells do you smell around your favorite place? (Do you smell flowers, wet leaves, food cooking, car exhaust?)

6. What do you like best about your favorite place?

On the back, draw a picture of your favorite place.

LESSON 3

Session 1: **THIS LAND IS YOUR LAND**

This session will emphasize the importance of water conservation. This session will last 30 minutes.

OBJECTIVES

The student will:

1 - Discuss Water Experiment #1 and share his/her observations with the class.

2 - List one strategy to help conserve or preserve water.

3 - Practice the water conservation or preservation strategy during the week and report their activities in his/her journal.

4 - Share articles pertaining to the environment with the class.

ACTIVITIES

1 - Lead a class discussion about the students' observations regarding Water Experiment #1. Explore ideas with the class that are related to water pollution and how it affects the five categories of land, air, water, animals, and plants.

2 - Have each student list one strategy in his/her journal that will help preserve or conserve water. Challenge students to practice the strategy that they listed during the week. Have each student share with the class what their strategy will be for the week.

3 - Allow students time to share environmental articles with the class.

Session 2: This session will seek to increase student awareness of litter and effective waste management on their environment.

Objectives:

The student will:

1 - Discuss what happened to Air Experiment #1 and write one strategy to help reduce air pollution in his/her journal.

2 - Complete the worksheet entitled "Litter Walk" and "Litter Container Maps" and answer the questions in his/her journal.

3 - Conduct a "litter walk" around his/her home and graph all litter according to its type.

4 - Draw a map of litter containers around the school.

ACTIVITIES

1 - Have students check Air Experiment #1 and discuss what happened to each hanger of rubber bands. Ask each student to list one strategy to help reduce air pollution.

2 - All students will be given the worksheet entitled "Litter Walk" and "Litter Container Maps." Students will go outside and conduct their own litter walk and report what types of litter they find in their journals. Students will answer all questions on the worksheet regarding the "litter walk."

3 - Students will be asked to conduct the same "litter walk" around their home and report all findings in their journals.

4 - Students will be asked to draw a map that identifies where all litter containers can be found around the school.

WALKING WORKSHEET

LITTER WALK

What to do: Take a litter walk. Don't forget your litter bag! When you get back to your classroom, classify and make a graph of the litter. Color in one space for each kind of litter that you find.

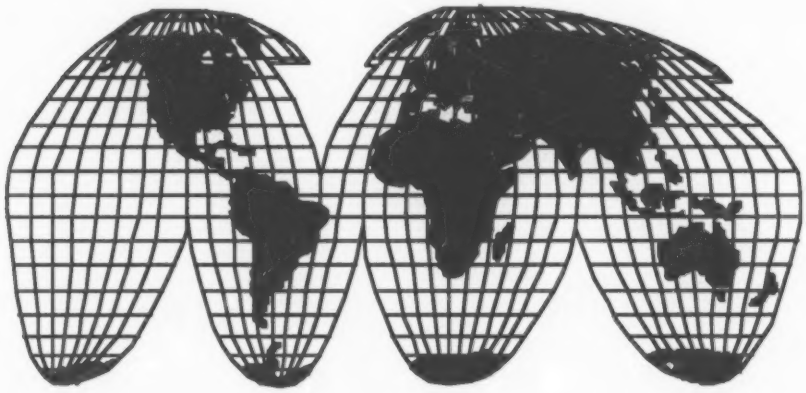
To think about:

- Where does each of the kinds of litter come from?
- Could any of the litter recycled? How?
- Why do you think people throw it on the ground?
- What could be done to make it easier for people to recycle or dispose of it correctly?

LITTER WORKSHEET

LITTER CONTAINER MAPS

How many trash cans are in the halls of your building? Do you know where the closest one is to your room?



Make a map of your floor or building. Place a sign on the map where trash containers are located. How many cans do you count? Do you need more cans? Could some of the ones you have not be placed in a better location?

Next, make a map of your school ground. Place a sign on the map where trash containers are located. Do you need more cans? Where should they be placed?

Lesson 4

Session 1: "ANIMALS NEED US." This meeting will last 30 minutes.

OBJECTIVES

The student will:

1 - Discuss his/her answers to the worksheet entitled "Litter Walk" and list one type of litter he/she found in their home "litter walk" that he/she graphed in their journals.

2 - Share their "litter container maps" with the class.

3 - Save one milk jug or carton for the next class meeting.

4 - List in his/her journal places at their home where they see birds and feel a bird feeder could be place.

ACTIVITIES

1 - Have students discuss their answers to the worksheet entitled "Litter Walk." Also discuss what students found in their home "litter walk."

2 - Have students share their "litter container maps" with the class. Discuss where the students feel more containers need to be and why they feel they are important.

3 - Students will need to investigate places around their homes where they see the most birds. Have students write their findings in their journals. Each student will need to bring in one milk jug or milk carton for the next class meeting.

Session 2: This session will be a hands-on experience for students consisting of birdhouse and feeder building. This meeting will last for 45 minutes.

OBJECTIVES

The student will:

1 - Make bird feeders and bird houses out of milk jugs or cartons.

2 - Watch his/her bird feeders and write their findings in their journals.

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ACTIVITIES

1 - Students will need to bring a milk jug or a milk carton from home. Students need to clean the jug or carton before bringing them to school. The milk jug will be used for the bird feeder. Have students cut two holes in the milk jug and place wire around the handle so they will be able to hang it. Give each student a small bag of bird seed so they can put it in their bird feeders at home.

The milk carton will be used for the birdhouse. Students will cut a small hole in the side of the milk carton below where it is folded. On the other side of the carton, each student will need to make two small holes with a nail and run a wire through the carton so it can be hung. Close the top of the milk carton with packing tape. Tell the students when they get home to find a pole or tree where they will be able to hang the birdhouse. Put two nails about a foot apart and wrap the wire around the nails. Students will want to put some dried grass in the bottom of the carton to make a bed for the birds.

2 - Ask students to watch their bird feeder or birdhouse and write observations in their journal.

Lesson 5

Session 1: RECYCLING'S FOR ME. This session will consist of a discussion about t. . bird feeder project and will allow students time to share articles about the environment. Students will also be given an energy audit to complete at home. This session will last 30 minutes.

OBJECTIVES

The student will:

1 - Share one observation from their journal regarding the bird project.

2 - Complete a home energy survey before the next meeting.

3 - Share an article regarding the environment with their group.

ACTIVITIES

1 - Have a class discussion in which each student shares an observation he/she made regarding the bird project.

2 - Divide students into groups and allow them 10 minutes to share articles about the environment with one another.

3 - Assign students the "Home Energy Survey" to be completed prior to the next meeting.

Session 2: This session will focus on assisting students in making paper form recycled materials and allowing students to report on their energy audit.

OBJECTIVES

The student will:

1 - Write one strategy that will help conserve energy in their home.

2 - Learn about the process of recycling paper by making recycled paper.

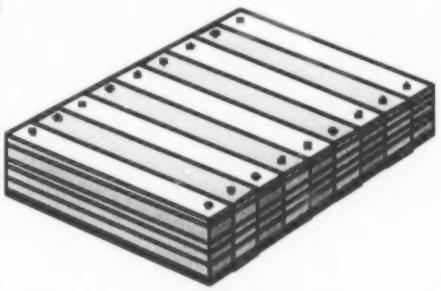
ACTIVITIES

1 - Students will participate in a class discussion about the "Home Energy Survey." Ask students what they found to be the most used appliance in their homes. Have each student write one strategy in their journal that would help conserve energy in their homes. Ask them to try the strategy for one week to see if it is successful.

2 - Students will make recycled paper. This project is adapted from the Eco-Experiment #7 (The Earth Works Group, 1990). Students will need the following materials:

newspapers
blender
5 cups of water
3" square pan
window screen to fit the pan
measuring cup
flat piece of wood the size of a newspaper's front page

Tear two and a half pages of newspaper into small pieces and place the pieces in the blender with 5 cups of water. Turn the blender on an blend until the paper becomes pulp. Pour one inch of water in the pan and put the screen in the pan. Pour one cup of the pulp into the pan. Spread the pulp evenly over the screen and left the screen up to let the water drain. Open a section of newspaper and place the screen and pulp in the middle of the section of newspaper. Close the newspaper and flip so that the screen is on top of the pulp. Place the board on top of the newspaper and squeeze out the excess water. Open the newspaper and take out the screen. Let the pulp dry for at least 24 hours. When the pulp is dry carefully peel it off the newspaper.



HOME ENERGY SURVEY

Choose an hour block of time during which you will record all the ways that energy is used in your house. Go about your normal activity but keep this survey sheet with you. Record every time a light is turned on, an appliance is used, someone talks on the phone, etc. Check those that were used during a one hour block of time.

The following list identifies some typical ways energy is used in the home. Use it as a starting point to keep track of the energy use in your home. Add to the bottom of the list other ways energy was used. Check the appropriate time you completed this survey:

_____ Morning _____ Afternoon _____ Night

TYPICAL HOME ENERGY USES

Lights _____
Hot Water _____
Home Heating _____

APPLIANCES

Television _____
Radio _____
Stereo _____
Telephone _____
Hair Dryer _____
Stove/Oven _____
Microwave _____
Refrigerator _____
Washer _____
Dryer _____
Toaster _____
Blender _____
Food Processor _____
Garbage Disposal _____
Dishwasher _____
Clock _____
Can Opener _____
Electric Blanket _____
Iron _____
Typewriter _____
Computer _____
Vacuum Cleaner _____
Air Conditioner _____

List any others here _____

_____

_____

Lesson 6

Session 1: "I CAN MAKE A DIFFERENCE." This session will last for 30 minutes.

OBJECTIVES

The student will:

1 - Write an observation he/she made from the recycled paper experiment.

2 - Report on the success of his/her energy conservation strategy.

3 - Share the articles that he/she has collected with the class.

4 - List products in their journals that they use everyday that are made of wood.

ACTIVITIES

1 - Students will examine the recycled paper and write their own observation in their journal.

2 - Students will discuss how successful their energy conservation strategy was and if it was easy to accomplish.

3 - Students will have time to share articles concerning the environment that they have collected with others in their class.

4 - Students will list products in their journals that they use everyday that are made of wood.

Session 2: This final meeting will summarize all project activities and culminate with students planting a tree.

OBJECTIVES

The student will:

1 - Share with the class one wood product that he/she wrote in their journal.

2 - Participate in planting a tree in front of the school.

ACTIVITIES

1 - Have a class discussion and allow each student to share one wood product that they listed in their journal.

2 - The class will plant one tree in front of the school as the concluding project for Project Sesame.